DOCUMENT RESUME

ED 260 849 PS 015 338

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TITLE Emotion and Cognition: A Developmental-Interactionist Perspective.
PUB DATE Apr 85
NOTE 32p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (Toronto, Ontario, Canada, April 25-28, 1985).
PUB TYPE Viewpoints (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Attribution Theory; Cerebral Dominance; *Cognitive Development; *Cognitive Structures; *Emotional Development; Linguistics; *Motivation; Self Control; Theories
IDENTIFIERS Personal Construct Theory; Rogers (Carl)

ABSTRACT

This paper discusses the interaction of cognition and physiological factors in emotion from the viewpoint of a developmental-interactionist theory of motivation and emotion. Emphasis is given to the role of cognition in the theory of emotion. The nature of cognition is discussed in terms of (1) the "primacy" of emotion versus cognition; (2) knowledge by acquaintance versus knowledge by description; (3) cerebral lateralization and cognition; and (4) the interaction of syncretic and analytic cognition. The discussion explores the role of language in controlling behavior. Subsequent discussion differentiates self-as-acquaintance and self-as-description; interprets Rogers' self theory and Kelly's theory of personal constructs; and explores the implications of the foregoing for attribution theory. Distinctions are made between purposive and reactive attribution and self cognitions, body cognitions, and environmental cognitions. In conclusion, the relevance of the discussion of attribution theory and self theory to cognitive dissonance theory is suggested. (RH)

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EMOTION AND COGNITION:
A DEVELOPMENTAL-INTERACTIONIST PERSPECTIVE

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Presentation at the symposium
''The Role of Affect and Goals
in the Development of Social Cognition.''
Society for Research in Child Development
Toronto, Ontario. April 27, 1985

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A Developmental-Interactionist Theory of Emotion

The Theory.

This paper will discuss the interaction of cognition and physiological factors in emotion from the point of view of a developmental-interactionist theory of motivation and emotion. This theory is illustrated in Figure 1 (cf. Buck, 1983a, 1984, 1985). It assumes that internal and external affective stimuli initially impinge on the primes directly and without cognitive mediation (cf. Gibson, 1966, 1973; Zajonc, 1980). The responses of these systems is determined by their state of arousal and arousability, which in turn is determined by a variety of situational and constitutional factors. The initial response to the stimuli is also influenced by classically conditioned associations with the affective stimuli which are unique to the individual. Together, the primes and these conditioned responses determine the impact of the affective stimuli for that particular individual in that particular situation.

This impact is registered at both cognitive and emotional levels. On the emotional level, adaptive/homeostatic mechanisms are activated (Emotion I), there are tendencies toward spontaneous behaviors (Emotion II), and subjective experiences occur, both directly from the activation of the primes (Emotion III) and indirectly via proprioceptive and autonomic feedback (dashed lines). On the cognitive level, the individual understands and interprets, or "appraises," the stimuli on the basis of past experience, the present situation, and the subjective emotional

experience. Once the stimulus is understood and appraised, or "labeled," the individual has a basis for making appropriate goal-directed coping responses and self-reports describing the response to the stimulus. These overt responses will be affected by display rules the individual has learned in that particular situation, which may also interfere with spontaneous expressive tendencies. That is, the individual may alter his or her overt emotional/motivational behavior to fit the requirements and expectations of a given social situation. At the same time, the labeled emotional/motivational state may become an internal stimulus in itself, beginning another cycle of response.

Insert Figure 1 about here.

The Readout Process.

Central to this theory is a ''readout process,'' in which motivational potential is actualized as emotion. The readout process is summarized in Figure 2. The source of the readout is biological motivation, which involves potentials for the activation and direction of behavior that are inherent in the hierarchically organized neurochemical systems that we have termed primes. When activated by challenging stimuli, this potential is ''read out'' to the appropriate target systems in the body: this readout process is emotion. As suggested in Figure 1, there are three general sorts of targets for this readout: systems involved in adaptation and homeostasis (Emotion I): systems involved in external expression (Emotion II); and systems involved in syncretic cognition (Emotion III). The functions of these readout

processes involve respectively (a) bodily adaptation and the consequent maintenance of homeostasis, (b) spontaneous communication and consequent social co-ordination, and (c) subjective experience and consequent self-regulation (Buck, 1985). The remainder of this paper will discuss the role of cognition in this developmental-interactionist theory of emotion.

Insert Figure 2 about here.

The Nature of Cognition

The "Primacy" of Emotion vs. Cognition.

The interactionist viewpoint. The issue of the role of cognition in emotion goes back to the controversy between the James-Lange theory of emotion and that of Cannon. The James-Lange theory (James, 1884) argued that the perception of an emotional stimulus causes bodily changes, and that the latter are experienced as emotion. This view clearly places the greatest emphasis upon cognition. In contrast, Cannon (1927) argued that an emotional stimulus acts first upon subcortical systems that simultaneously and independently inform the cortex (in the form of affective experience) and the body. In Cannon's theory, cognition is not a necessary part of the emotion process. Most contemporary theories of emotion authored by personality and social psychologists--including Schachter (1964), Averill (1980), Mandler (1984), and Scherer (1984)--assume the primacy of cognition, while the views of most physiological and neuropsychologists derive from Cannon, via the progressively more recent work of Papez (1937), MacLean (1969, 1970, 1973), Panksepp (1982) and others.

Emotion without cognition? The contemporary controversy about the relative primacy of emotion and cognition began with studies by Robert Zajonc and his colleagues, which purported to demonstrate that an individual could respond preferentially to stimuli before knowing what they were (Kunst-Wilson & Zajonc, 1980; Wilson, 1979; Zajonc, 1980; 1982). Zajonc' argument drew strong criticism from those who argue that cognition is a necessary part of emotion--that one in effect cannot feel anything toward something that is not known. One of these critics was Richard Lazarus (1982; 1984), who argued that emotion cannot occur without cognitive appraisal. Lazarus defines appraisal as the evaluation by the individual of the harmful or beneficial significance of some event. If the stimulus is appraised as threatening or beneficial, coping strategies are cognitively selected to deal with it. Thus cognition is considered to be central to emotion. Recently, Lazarus (1984) has expanded on this theme, arguing that ''cognitive activity is a necessary precondition of emotion because to experience an emotion, people must comprehend...that their well being is implicated in a transaction, for better or worse'' (p. 124). This need not be a conscious, rational sort of cognition, however. Lazarus states that appraisal can involve a conscious, rational, symbolic process; but that it can also be a ''primitive evaluative perception'' (1984, p. 124) that is ''global or spherical'' (1982, p. 1020). Lazarus appears to be making a distinction here between two different types of cognition, but this is not explicitly acknowledged. Zajonc (1984) replied that cognition must require

some sort of transformation of sensory input--some kind of ''mental work''--and he complained that ''Lazarus has broadened the definition of cognitive appraisal to include even the most primitive forms of sensory excitation'' (p. 117). Thus Zajonc and Lazarus appear to agree that some form of sensory information is necessary for emotion, but they disagree about what would constitute ''cognition.'' This brings up the question of just what constitutes cognition, or put slightly differently just what constitutes knowledge.

Knowledge by Acquaintance vs. Knowledge by Description.

The key to the resolution of the controversy between Zajonc and Lazarus may be in recognizing that there is more than one sort of ''cognition.'' This may be clarified by a distinction that has long been made between knowledge by acquaintance, which involves direct sensory awareness, and knowledge by description, which involves the interpretation of sensory data. This distinction was made by St. Augustine in De Magistro (Marsh, 1956), and it is reflected in many languages, as in the French connaitre vs. savoir (James, 1890). More recently, it occupied a central place in Bertrand Russell's (1912; 1956) epistemological theory.

Knowledge by acquaintance. According to Russell, knowledge by acquaintance involves ''direct sensory awareness without the intermediary of any process of inference or any knowledge of truths (1912, p. 73).'' It is the presentational immediacy of experience and is completely self evident. ''Thus in the presence of my table I am acquainted with the sense-data that make up the appearance of the table: its colour, shape, hardness, smoothness,

etc.; all these are things of which I am immediately conscious when I am seeing and touching my table (1912, p. 73).'' It is noteworthy from our point of view that knowledge by acquaintance includes not only awareness of sense data from the environment, but also the awareness of internal states. These include in particular the awareness of feelings and desires, e.g. emotional and motivational states (Russell, 1912; 1948).

William James (1890) describes knowledge by acquaintance as follows: ''I know the color blue when I see it, and the flavor of a pear when I taste it...but <u>about</u> the inner nature of these facts or what makes them what they are I can say nothing at all. I cannot impart acquaintance with them to any one who has not made it himself...At most, I can say to my friends, 'Go to certain places and act in certain ways, and these objects will probably come' (p. 221).''

<u>Knowledge by description</u>. In contrast, knowledge by description involves the <u>interpretation</u> of sense data. As Russell (1912) puts it, ''My knowledge of the table as a physical object...is not direct knowledge. Such as it is, it is obtained through acquaintance with the sense-data that make up the appearance of the table...the table is 'the physical object that causes such-and-such sense-data.' This <u>describes</u> the table by means of sense data (pp. 73-74).'' It might be added that according to Piaget the concept of the table as a physical object depends upon experience with objects. In other words, Piaget's theory suggests that the external environment--known initially by acquaintance only--becomes known by description during the course

of cognitive development, as the child learns to organize his or her knowledge-by-acquaintance on the basis of past experience with the environment (Piaget, 1971). For example, our knowledge-by-acquaintance of a rose is always unique and particular: it takes years of the development of knowledge-by-description to learn that ''a rose is a rose is a rose.''

Russell has pointed out that it is impossible to refute someone who believes that the world was created five minutes ago complete with memories and records. This is because our conception of the world as a stable and permanent place is based upon knowledge by description. Knowledge-by-acquaintance is limited to immediate experience, and in a sense it is all that we can <u>really</u> be sure of. The Chinese philosopher Lao Tse is reputed to have said that he could not really be sure if he was Lao Tse, who last night dreamed that he was a butterfly, of if he was a butterfly who was now dreaming that he was Lao Tse.

Both James and Russell agree that knowledge by description depends upon knowledge by acquaintance, and follows it in time. As James puts it, ''feelings are the germ and starting point for cognition, thoughts the developed tree (1890, p. 222).'' This conception is consistent with the argument of Zajonc (1980) that ''affect and cognition are under the control of separate and partially independent systems (p. 151),'' and that affective responses preceed in time cognitive operations (cf. Kunst-Wilson and Zajonc, 1980; Wilson, 1979).

It should be noted that this does not imply that cognitive knowledge by description has no influence upon the nature of our

feelings. As Schachter (1964), Lazarus (1984), and others have emphasized, such factors clearly influence the determination of motivational/emotional states. For example, our emotional response to the sight of a tiger will certainly be different if we see it at the zoo or suddenly in our living room. However, whatever our affective response might be, whether it is one of fear or mild interest, it is known to us by acquaintance. The brain ''knows'' how to experience fear or mild interest, hunger or pain just as it ''knows'' how to experience the color blue or the taste of a pear. This is the Emotion III process. Just as our affective response tends to be expressed outwardly to others via spontaneous nonverbal behavior--the Emotion II process--it is accessible to the cognitive system in the form of subjective emotional experience (Buck, 1984, 1985, in press).

Cerebral Lateralization and Cognition.

There is considerable evidence that the right and left hemispheres are associated with different kinds of cognition. The left hemisphere appears to be associated with knowledge by description in that it involves the interpretation of sense data. It is analytic, breaking sense data into meaningful pieces which are equivalent to one another, for example: a rose is a rose is a rose. It is also linear, tending to organize these pieces into sequences, and symbolic, in that it is adept at attaching sense data to learned shapes and sounds. These abilities explain the great importance of the left hemisphere in the control of language and other symbolic functions (cf. Buck, 1984).

The right hemisphere, in contrast, appears to be associated

with a wholistic, synthetic sort of cognition that has been termed ''syncretic'' cognition (Tucker, 1981). Tucker suggests that this provides an integration of sensory information from different channels--visceral, visual, auditory, tactual, etc.--into a ''superordinate conceptualization.'' He also suggests that such a conceptualization is particularly important in emotion, providing the ''kind of perception and behavioral organization necessary for adequate emotional functioning.'' (p. 22). It seems reasonable to suggest that this is the basis for knowledge by acquaintance.

An interesting and relevant observation comes from an important study by Sperry, Zaidel, and Zaidel (1979) on patients in whom the corpus callosum had been cut. A specially-designed contact lens restricted the vision of the patients to one-half the visual field, allowing the presentation of visual stimuli to the desired hemisphere. This permitted prolonged examination and free scanning of the stimulus by the patient. Stimuli included pictures, photographs, and drawings in arrays of 4-9 items arranged on 25 x 25 cm. cards. Emotionally-loaded material--including pictures of the patient and his or her family, pets, friends, belongings; scenes familiar to the patient; and well-known public/historical figures (Hitler, Churchill, Richard Nixon) --were interspersed among neutral material. Patients evaluated the items by giving a ''thumbs up'' or ''down'' gesture, and they pointed to pictures they liked, disliked, or recognized.

When presented to the left hemisphere, the affect-laden stimuli produced prompt recognition and verbal evaluation. When presented to the right hemisphere, they produced marked emotional

reactions, and the patient could point to the critical item, but could not verbally explain the response. In a case where pictures of the patient were unexpectedly included in an array, the patient examined the material for about seven seconds, and then exclaimed: ''Oh no!...Where'd you g...What <u>are</u> they?...(laugh)...Oh God!'' (p. 158). When the array was removed and the examiner asked what was in the picture, the patient responded in a loud emphatic voice: '' 'Something nice whatever it was...Something I wouldn't mind having probably.' This was followed closely by another loud laugh'' (p. 158). Sperry et al (1979) suggest that ''the emotional components of the reaction triggered in the right hemisphere crossed rapidly to the left hemisphere through brainstem mechanisms and colored the tone of speech in the vocal hemispere. However, the content of the subject's remarks shows that the left hemisphere remained unaware of the exact stimulus material that had triggered the emotional reaction in the other hemisphere'' (p. 159). They note that the emotional responses from the right hemisphere were ''more intense and less restrained'' than those from the left (p. 156). These observations are consistent with theories which suggest that the right hemisphere is responsible for emotional responses that are controlled by the left (e.g Tucker, 1981; Buck, 1984).

We suggested that the distinction between knowledge by acquaintance vs. description may be the key to the resolution of the controversy between Zajonc and Lazarus. We saw that Lazarus includes ''primitive evaluative perceptions'' in his definition of cognition, while Zajonc argues that ''pure'' untransformed sensory

input does not qualify as ''cognition.'' Both accounts are reasonable descriptions of syncretic cognition, in Tucker's terms, although Lazarus does not distinguish it from analytic cognition while Zajonc does not consider it to be cognition. The major disagreement thus appears to be definitional rather than substantive.

The Interaction of Syncretic and Analytic Cognition.

We have suggested that Emotion III involves a direct cognitive readout of motivational-emotional states which evolved in much the same way that external expressive behavior evolved. In effect, this argues that the analysis of the evolution of emotional expression may be applied also to an internal syncretic-cognitive registration of motivational/emotional states which is a kind of direct subjective experience of emotion. The reasoning is as follows: once the nervous system of a species has evolved sufficiently to develop even the rudiments of a general-purpose cognitive system--an ''internal representation of reality''--it becomes important that that cognitive system have direct access to the state of the primary motivational-emotional systems.

This kind of arrangement would seem to have at least two major advantages. First, the readout of the motivational-emotional states in syncretic cognition could facilitate their handling via analytic cognition. In effect, the syncretically experienced state becomes an ''object'' for analytic cognition just as do events in the external environment. This would encourage cognitive participation in adaptation, and increase the organism's capacity for self-regulation. Thus we appear to ''know

we are hungry'' not via stomach contractions or other signals of tissue deficit, but through a more direct, albeit little understood form of syncretic information. Such information may be necessary for the kinds of adaptive anticipatory behavior and incentive motivation which precede homeostatic deficits and which have been recognized in animals (Mogenson & Phillips, 1976). Thus the Emotion III readout is useful and perhaps necessary for analytic cognition to participate in bodily adaptation and self-regulation.

The second advantage is that such a system would allow analytic-cognitive control over the outward expression of the motivational-emotional state. Ekman and Friesen (1975) have noted the importance of ''facial management techniques'' by which one controls one's outward display to fit the requirements of the situation by intensifying, deintensifying, substituting for, or masking one's ''true feelings.'' Observation suggests that the same phenomenon occurs in animals; a frustrated and apparently angry monkey may express its ''true feelings'' only to a lower-ranking member of the group. Some degree of analytic-cognitive control over the ''fight or flight'' response must be necessary in social species where fighting and fleeing must be regulated for the good of the group. This kind of control is presumably part of what is learned by the infant rhesus monkeys studied by Harlow and his colleagues (Harlow & Mears, 1983).

Language and the Control of Behavior.

It seems clear that human motivation and emotion are based upon biological systems, as they are in all animals. It is also

clear that in both humans and animals, learning and cognitive factors based upon individual experience build up an internal representation of reality which interacts with biological motives and emotions. This kind of cognitive-emotional interaction, involving both knowledge by acquaintance and knowledge by description, is clearly not unique to humans. What is unique to humans is language, which has created a culturally-patterned system of behavior control that is functionally independent of biology, and fundamentally different from anything seen in animals:

> Only in humans does behavior come so completely under the control of factors that are mediated by language, including logic, reason, and social rules. This fact is at the crux of the understanding of the uniquely human aspects of motivation and emotion (Buck, 1985, page 406).

Linguistic control systems enable humans to transcend personal experience, allowing the symbolic sharing of experience and the contemplation of possibilities that have never been and could never be experienced.

The power of linguistically-structured rules in the control of human behavior explains the ability of purely cognitive approaches to social behavior and personality to account for so much without considering biologically-based emotional and motivational systems. However, behavior is simultaneously affected by ancient and phylogenetically structured systems of control, and it is clear that an ultimate understanding of human nature will depend upon the consideration of both sorts of systems and how they interact with one another.

The development and maintenance of linguistic control systems

requires a kind of motivation that is absent in animals: needs for understanding and for cognitive consistency for example underlie the uniquely human attributes of logic and reason. Such motives are potentials inherent in the structure of linguistic control systems just as the biologically-based motives considered above are potentials inherent in the structure of the primes.

The notion that there are different levels of systems of behavior control is summarized in Figure 3. The primary motivational/emotional systems, or primes, comprise a biologically-based hierarchy of systems of behavior control that has evolved according to the requirements of the species in question. Its structure is thus based upon phylogeny (Buck, 1985). Species requirements also result in the evolution of systems of learning and cognition, which underly a system of behavior control involving an internal representation of reality which reflects the experience of the individual organism. Its structure is thus based upon ontogeny. Both of these systems occur in animals as well as humans. What appears to be unique to humans (and perhaps some apes and cetaceans) are the systems of behavior control exemplified by language, which can transcend experience. Mathematics, logic, and other abstract symbolic systems can similarly be seen as systems of behavior control that have their own rules independent of biology and individual experience.

Insert Figure 3 about here.

Self vs. Body in Attribution Theory

The notion of linguistically-structured rules is relevant to theories involving the self. In a very general sense, ''self'' is used to refer to all qualities of the individual, including his or her feelings, desires, perceptions, attitudes, and evaluations of the self and others (Hall & Lindzey, 1957). In accordance with our previous discussions, we must distinguish between two aspects of the self: the self-as-acquaintance which is our immediate syncretic experience of feelings, desires, percepts, etc.; versus self-as-description which involves the self as an object. In terms of Figure 1, self-as-acquaintance constitutes subjective experience--the syncretic information that is part of the raw material for the labeling and appraisal process of self-attribution. Self-as-description in contrast involves the appraised and labeled information--it is the result of the self-attribution process. Most cognitive theories in psychology involve the self-as-description: ''I am afraid.'' ''I like the toy.'' ''I am responsible for that.'' are all instances of self-as-description.

Rogers' Self Theory.

This perspective has much in common with the self theory of Carl Rogers (1951). As Hall and Lindzey (1957) point out, Rogers made a distinction between two systems of behavior regulation: the organism and the self. The organism is the total individual which is known to the self as part of the phenomenal field of experience. The self is a differentiated portion of that

phenomenal field which consists of a pattern of conscious perceptions. ''Consciousness'' differs from ''experience'' in that experience involves everything going on within the organism--physiological processes, sensory impressions, motor activities--only a small proportion of which are consciously perceived. Most of these experiences become conscious only when the need arises--we can always feel the feelings of our shoes, or our affects, if that becomes important. Consciousness for Rogers consists of that which can be symbolized. In our terms consciousness involves the knowledge-by-acquaintance of certain portions of experience which potentially can be known by description--i.e. appraised and labeled. The self is a differentiated portion of consciousness that is organized and patterned by experience and in humans by language.

Kelly's Theory of Personal Constructs.

This view of the self as a linguistically organized and consistent system can also be related to G. A. Kelly's (1955) theory that persons learn to construe themselves and the world by recognizing repeated themes. They develop systems of constructs analagous to yardsticks, which serve in the measurement of persons, objects, and events, and facilitate predictions about the future. These constructs may be viewed as linguistically-structured rules which generate and regulate action.

The self can thus be viewed as a system of linguistically-structured rules about behavior built up over the lifetime of the individual in his or her particular physical, social, and bodily environment (Reardon & Buck, 1984). It is governed by its own

principles of internal organization, which in humans is dominated by princples of logic and reasoning mediated by language. That is, information from the physical and social environment--and the bodily environment--is integrated over time and linguistically structured into a system of rules about behavior. If there are significant changes in any of these--i.e. if the physical environment changes due to a move; or the social environment changes due to marriage, birth or bereavement; or the bodily environment changes due to illness or stages in biological cycles--the rules developed that constitute the self may no longer be valid. Under such circumstances changes in the rules are required. Coping can be viewed as the process of changing the rules that constitute the self as a result of changes in the physical, social or bodily environment Reardon & Buck, 1984).

Attribution to Self vs. Body.

The body as a source of attribution. The foregoing has important implications for attribution theory. In attribution theory, the causation of events is usually held to be attributed to either ''external'' situational factors or ''internal'' personality dispositions: i.e. the self. If behavior is attributed to the latter, the individual is seen to be responsible for that behavior. In many cases, however, behavior is seen to be caused by strong ''emotional'' factors that are in a sense distinct from the self. Schneider, Hastorf & Ellsworth (1979) have pointed out that traditional attribution theory has not paid attention to expressive emotional behaviors. It has instead focused upon intentional behaviors that produce visible effects.

In the process of determining whether these behaviors are caused by internal dispositions or situational factors the observer is in effect trying to figure out what purposes they serve. Such purposive attribution is not possible with expressive behaviors, because such behaviors are seen to be unintentional, and it does not make sense to inquire about what purposes they serve. Instead, expressive behavior involves reactive attribution, in that observers assume that it is a reaction to some strong internal or external stimulus. Instead of looking at the effects of the behavior and using them to infer the actor's intentions, the observer looks at the causes of expressive behavior and attempts to figure out what provoked it. In doing this, however, the nature of the ''internal'' causes of behavior becomes problematic. In the case of intentional behavior, the internal causes can be attributed to conscious purposes associated with the self, but that is not the case with expressive behavior.

There are many instances where events occurring in the body--the effects of drugs, disease, brain damage, etc.--powerfully affect behavior in the absence of strong external stimuli. Such events cannot easily be attributed to either external or internal causes in the usual attribution theory sense of these terms. They are like internal causes in that they are inextricably part of the individual, but they are like external causes in that they are not intentional or purposive and consequently the individual is not held to be fully responsible for them. The individual is seen to be less responsible for a ''crime or passion'' than a ''cold-blooded killing,'' and if

biological factors are implicated in the behavior (as they increasingly are as our ability to observe them increases) the attribution of guilt to ''insanity'' is typically straightforward.

This implies that two different sources of internal attribution must be distinguished: attribution to the self, which is internal attribution in its usual sense; and attribution to the body, which involves biological sources of behavior control. In essence, attribution to the self involves the behavior control systems of rules structured by learning, cognition and language; while attribution to the body involves the behavior control systems structured by biology--the primes.

B cognitions vs. S cognitions. Cognitions about the body are cognitions about the primes that are known by description via the Emotion III process; that is, known via the conscious acquaintance with syncretic information from the primes. We might term these B Cognitions. Cognitions about the self (S Cognitions) involve conscious knowledge of portions of the ''organized, fluid, but consistent'' system of rules that is structured by learning, cognition, and language over the life of the individual. To be consistent, we shall label cognitions about the external environment E Cognitions (See Figure 4).

This view is different from the common notion that emotion involves a different kind of cognitive processing than does ordinary cognition. Emotion is often seen as a process that mediates between the environment and cognition, altering the way that the environment is known. Thus ''hot cognition'' is viewed as different from ordinary (cold?) cognition in ways that are not

well specified. Rather that viewing emotion as a mediating link, the present view argues that emotion simply involves another source of information--the body--and that there is nothing special or mysterious about the cognitive processing.

The foregoing discussion of attribution theory and self theory is relevant also to cognitive dissonance theory. One of the cognitive elements in dissonance theory is typically about oneself: i.e. one's feelings, desires, or behaviors. Sometimes these elements might involve the self, at other times the body. Cognitive dissonance may thus involve dissonance between E and B cogntions: ''It is safe.'' vs. ''I feel afraid;'' ''There is tasty food.'' vs. ''I am not hungry;'' ''I am healthy.'' vs. ''I feel sick.'' Alternatively, cognitive dissonance may involve dissonance between E and S cognitions: ''I wrote an anti-abortion essay.'' vs. ''I am pro-choice.'' It is the latter sort of cognitive dissonance that has been emphasized in recent theorizing, although Festinger's original model included examples of dissonance involving B cognitions (Festinger, 1957).

Insert Figure 4 about here.

All of this suggests a basis for integrating cognitive dissonance, attribution, and self theories. All of these are theories in which the motivational force is provided by linguistic-cognitive motives--for understanding, causal explanation, consistency, order, a ''good gestalt'' (with the important proviso that inconsistency is tolerated and even preferred if it seems to be assimilable. See Piaget, 1971;

Neisser, 1977). With this motivational basis in common, these theories can be seen as differing according to the object of interest that they deal with and the kind of process--the specific sort of linguistic-cognitive motivational process--that they emphasize. Self theories deal primarily with the self as the object of interest, and they emphasize a variety of linguistic-cognitive motives that are responsible for its development and maintenance. With balance and cognitive dissonance theories, attitude change is usually the object of greatest interest, and the linguistic-cognitive motive that is stressed is the tendency for cognitive consistency. In attribution theory, the attribution of the causes for behavior is the object of interest, and the need for understanding and causal explanation is the motivational force that is emphasized.

Introducing the body into these theories--the primary motivational/emotional systems as known to analytic cognition by acquaintance via the Emotion III process--provides to them all a new source of richness and variety. There are now three sorts of analytic cognition to consider: B cognitions in addition to S and E cognitions (See Figure 4). From the point of view of a cognitive theorist, the introduction of biologically-based motivational-emotional systems into their theories will undoubtedly entail some cognitive inconsistency, but we trust that the assimilation and accomodation of this point of view will advance our understanding considerably.

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Figure 1. A General Model of Emotion.

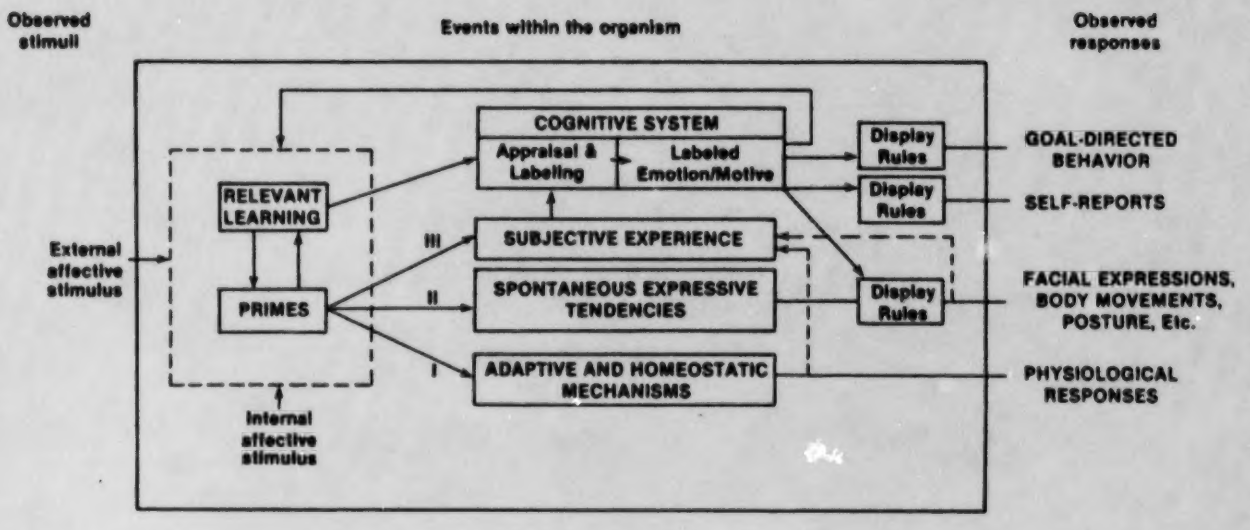

Figure 2. The Readout Process.

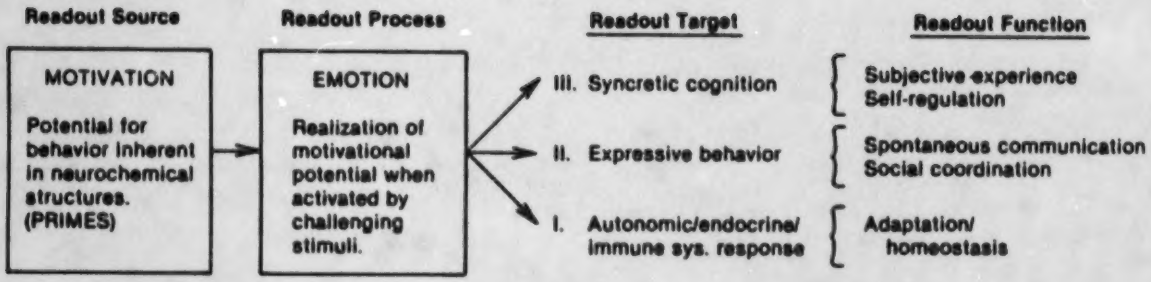

Figure 3. Systems of Behavior Control

Biological	Learned	Linguistic
Special-purpose control systems and structured by evolution and	General-purpose control systems structured by the individual's experience and	Formal ways of categorizing organizing information about the internal external environment
(phylogeny)	(ontogeny)	
Reflexes, instincts, drives, affects, effectance motivation	Conditioning Instrumental learning Cognition	Language Mathematics Logic

Motivation: Potential for behavior that is built into a system of behavior control.

Emotion: The readout of motivational potential.

Figure 4. A Typology of Cognition.

Summary of the typology of cognition suggested in the text.
See text for details.

KNOWLEDGE BY ACQUAINTANCE.

Environment-by-acquaintance.
Self-by-acquaintance.

KNOWLEDGE BY DESCRIPTION.

Environment-by-description: E Cognitions.
Self-by-description: S Cognitions.
Body-by-description: B Cognitions.

Note: Knowledge by acquaintance involves the direct perception of ''pure'' sensation from the external and internal environment. The former is the raw material of E cognitions, the latter the raw material of S and B cognitions.